WETLAND MONITORING AND ASSESSMENT DEMONSTRATION: IDENTIFYING AT-RISK COASTAL WETLAND RESOURCES AND SUPPORTING CLIMATE CHANGE RESPONSES

EPA Region 1, Wetland Program Development Grants 2013
Submitted under **TRACK ONE**

MASSACHUSETTS WETLAND PROGRAM PLAN Core Element/Action/Activity:
Monitoring & Assessment (a) 4 and (e) 6;
Regulation (a) 8; Voluntary Wetland Restoration and Protection (a) 1

Applicant: Massachusetts Office of Coastal Zone Management (CZM); DUNS #: 824848451

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Geographic Location: Statewide

Total Cost: $ 217,133 Total Dollars Requested: $162,133 Cost Share/Match: $55,000

Abstract: A major impediment towards effectively addressing the threats of sea level rise to coastal wetlands is our ability to accurately identify the resources at risk, to understand the possible effects on and changes to these different habitat types, to communicate these risks and vulnerability, and to use this information to advance robust coastal planning and management strategies. With this project, CZM and partners seek to address these challenges in ways that will result in specific changes to Massachusetts Department of Environmental Protection's (MassDEP) Wetlands Program, and to the way coastal managers and landowners understand and incorporate potential climate change impacts into actions. Through this project, site-specific information and maps will be developed from model outputs to identify and communicate vulnerability, risk, and impacts to Massachusetts's coastal wetlands under various scenarios of sea level rise. The data and information generated will result in more accurate and informed forecasting of coastal wetland changes, including areas of loss, areas

where marsh migration may be supported, and areas that are predicted to undergo changes in wetland types. The information will be shared with managers, decision-makers, and others to support enhanced management, planning, and regulation. Additionally, CZM will establish long-term monitoring stations at locations identified with modeling results as benchmarks, chosen based on mapping results, to begin a program to monitor changes to physical and biological parameters and detect changes in plant communities at the salt marsh-upland ecotone boundary.

B. Project Description

1. <u>Program Priorities (Track One)</u> - This proposal seeks funding to support the 5-year Massachusetts Wetland Program Plan (WPP) 2011-2015, updated by MassDEP on May 28, 2013 for their proposal submission. CZM collaborated with MassDEP to develop the 5-year Wetland Program Plan (WPP) that was submitted on October 28, 2010 and approved by EPA on December 22, 2010. The WPP has been updated by MassDEP for this proposal (Appendix A), and our project addresses the following WPP Core Elements, Actions, and Activities: Monitoring and Assessment: (a) 4 and (e) 6, Regulation (a) 8, and Voluntary Wetland Restoration and Protection (a) 1, which are highlighted in the revised WPP. Efforts to develop an approach for monitoring and assessment and for regulatory goals to address projected impacts from sea level rise and climate change to wetlands resources represent a new challenge for state agency programs. Data and trends suggest that environmental changes that will alter coastal wetlands are occurring, but site-specific information and the extent of changes that could be used to predict where the changes will occur have not been available. Improvements in modeling capability and newly available information on physical parameters suggest that predictive tools can be developed to better inform future changes and to assist

with planning efforts. This proposal has been developed to address the goals in accordance with EPA's *Core Elements of a Wetlands Program* (April 2006).

As the completion of current research and modeling efforts to develop approaches for monitoring and assessing wetland conditions nears, a logical next step is to begin to address goals, actions, and activities for specific threats, such as the threat of change and loss of habitat due to impacts from sea level rise and climate change. Predictive tools are needed that have scientific validity, as well as offer assistance with approaches to improve protection and management efforts at state and local levels in a site-specific manner. This proposal will build on and refine existing models to improve the identification of coastal wetland areas at risk and to develop management approaches in cooperation with agency and local partners that can be practically implemented by government and private landowners. It is proposed to begin specific wetland monitoring efforts to scientifically document changes in response to sea level rise. This projects aims to develop an approach and strategies to meet the needs.

2. **Description of Need** - As described above, program needs are documented in MassDEP's *Massachusetts Wetlands: Monitoring and Assessment Strategy*, and the recently revised WPP. This project will advance goals, actions, and activities as outlined in the WPP for developing modeling tools and mapping products to support monitoring and assessment and regulatory objectives and voluntary wetland restoration and protection activities.

In its 2010 *Massachusetts Climate Change Adaptation Report*, the Executive Office of Energy and Environmental Affairs and the Massachusetts Climate Change Adaptation Advisory Committee, outlined vulnerabilities and impacts of climate change in Massachusetts, and provided strategies that could better prepare the Commonwealth for this changing world. Among the findings of the report include: (1) predicted sea level rise and the associated

increases in flooding and erosion will have adverse effects on natural resources and ecosystems, and (2) there is a strong need to expand mapping and monitoring so that more robust and precise information can be advanced to support the development of strategies targeted to changing conditions. One of the overarching strategies in the report is to enhance modeling to address vulnerabilities of natural resources, and specifically to identify the location of future habitats (and resource areas) through the implementation of predictive mapping and modeling, as a necessary step in the protection of these evolving ecosystems.

In its most recent Coastal Program Section 309 Assessment and Five-Year Strategy for Program Enhancement (FY2011-2015), CZM detailed the need to better understand the vulnerability, risk, and impacts to complexes of coastal wetlands under various scenarios of projected sea level and articulated a strategy to address these challenges.

State agencies, academic research programs, and community-based stakeholders have expressed strong need, interest, and willingness to collaborate on efforts to model, map, and monitor changes to coastal wetlands. Wetlands restoration projects and land conservation efforts will benefit from a better understanding of future conditions. Appendix C contains letters of support from MassDEP, the Massachusetts Division of Ecological Restoration (MA DER), the University of Massachusetts and Eight Towns and the Great Marsh— a MassBays National Estuary Program (NEP) partner.

3. **Regional Priority Areas** - This proposal addresses the key EPA Region 1 priority areas to promote coordination and accelerate research to ensure that wetland complexes of high ecological value and areas that provide resilience for wetland impacts from climate change are protected in Massachusetts and which can serve as a model approach for other New England states and elsewhere. Coastal wetland resources are highly valued due to the numerous

environmental services that they provide, including important habitat for various life stages of fish, shellfish, and other animals and for buffering the coast from wave and storm action during normal and extreme events. Coastal wetlands are also especially vulnerable to sea level rise and natural salt marsh transgression into uplands will be impeded by coastal structures and developed shorelines. For planning and management purposes, it is important to identify and protect those areas where landward migration can occur, which is the goal of this proposal. This project will refine currently available modeling efforts, using newly available and more site specific data layers, to project with greater accuracy where landward migration is expected to occur. The project will also engage regional wetlands scientists, federal, state, and local environmental officials, and also local and environmental non-profit land owners to develop land use protection and management strategies to enhance the integrity of coastal wetlands. The final project report will serve as model for other areas seeking to make more accurate localized projections of landward migration of salt marshes and to demonstrate a consensus approach among land managers and scientists for the practical protection and regulatory actions needed to enhance the survival of this critical wetland habitat. This work will define objectives and strategies for long-term monitoring associated with environmental outcomes, will help to inform decision-making and protection in the face of changing environmental conditions, and will offer a strategy for site specific management of wetland resources for both government and non-profit land managers aimed at assisting with responses to projected site specific changes in coastal wetland habitats as a result of climate change.

4. Outputs, Outcomes, and Results

Outputs - CZM and its partners will develop products to benefit state agency programs—including especially CZM, the NEPs, MassDEP, and MA DER—as well as cities and towns and

other stakeholders such as NGOs, watershed associations, and land conservation groups under this effort. Products include a predictive tool that will identify risks and impacts to coastal wetlands, map and visualize the results, and develop effective methods to communicate the risk and vulnerability information to state and local managers and decision makers as well as private property owners and interested/affected public. Comprehensive datasets on physical attributes of salt marshes, marsh migration potential, barriers to marsh migration, and inundation at multiple scenarios of sea level rise will be produced. Additionally CZM will establish a long-term monitoring network program, beginning with station setup and baseline data collection, towards the long-term goal of developing a comprehensive record of change due to sea level rise for trends analysis and pattern detection. Quality assurance test reports and the overall project report will be submitted to EPA and made available on the CZM website. Final GIS datasets will be made available via the Massachusetts Ocean Resource Information System (MORIS), a web-based mapping application that allows users to search, identify, print, share, and interact with hundreds of datasets relating to the coastal environment.

Outcomes - Anticipated outcomes for this project include site specific, statewide forecasts of wetland impacts—including areas where there is high vulnerability to loss, areas where change in type could be expected, and areas where wetlands could migrate and sustain. With available models and forecasts, another outcome is an improvement in our ability to enhance planning, management and regulations such as: support for regulatory decisions, consistency determinations, and the interpretation and implementation of specific performance standards; augmented or new coastal program policies; determination of priority restoration areas; and the identification of sites for land acquisition or easement actions. In partnership with MassDEP, project outputs, including datasets and reports on marsh migration potential and

barriers to landward migration, will be used to assess the fitness of current wetland buffer and setback regulations in protecting coastal wetlands at risk from sea level rise; these assessment will be used to propose new regulations, as needed. Additionally, outputs will provide resource managers with information on the barriers to landward migration, which would be used to manage hardened structures, including their proposal, maintenance, or removal. Outputs will also provide public and private coastal landowners with information and guidance to direct land acquisition efforts. When paired with CZM's StormSmart Coasts programs, coastal managers will have a broad array of information, tools, and guidance to critically evaluate existing measures, and propose new management practices and by-law changes in response to forecasted sea level rise, increased storm surge, and other potential climate change impacts.

Link to the EPA Strategic Plan - The purpose of this project is to develop a strategy to monitor and assess the potential impacts of climate change, especially sea level rise, on the quality and quantity of coastal wetlands. This work will directly meet EPA's strategic goal (Objective 2.2) of increasing wetland acres with a focus on the assessment of coastal wetland condition.

Tracking Outputs and Outcomes - Data developed or collected will be documented in a MassDEP and EPA approved Quality Assurance Project Plan (QAPP) to ensure high quality data collection and development. Baseline data collected at long-term monitoring station will be entered into an industry-standard database. All data development, model parameterization, and statistical analysis, including QA/QC tests, will be fully documented in reports. Interactive, web-based maps, static maps, and GIS data will be provided, along with guidance on their use and next steps in creating action plans. Progress reports will be submitted to EPA quarterly.

5. Project Tasks (includes 7. Milestone Schedule, and 8.(a) Detailed Budget Work Plan by Task) - CZM has committed existing resources to initiate the foundational elements of this

project by implementing two key start-up tasks: (1) Convening a Technical Advisory Committee (TAC), consisting of technical and subject matter experts from the region; and (2) Working with investigators at Marine Biological Laboratory's (MBL) Plum Island Ecosystems Long Term Ecological Research Program on data compilation and synthesis and assistance with model parameterization, runs, and quality assurance.

CZM is seeking funds to support staff for project management and implementation and engage a sub-contractor to compile and prepare statewide data, run the model (Sea Level Affecting Marshes Model or a comparable model that simulates long-term SLR impacts to marshes), and perform parameter sensitivity and elevation uncertainty analyses on results.

Task 1: Compile and develop data inputs to run model (SLAMM or comparable).

Timeframe: Feb 2014 - Apr 2014. Federal Funds Requested: $35,000; Matching Funds: $11,666.67; Total Cost: $46,666.67. Description of Activities:

a. Develop a Quality Assurance Project Plan (QAPP) for salt marsh migration modeling and GIS analysis. [Lead: CZM; Support: Sub-contractor, TAC, MBL]
b. Compile and develop datasets for use as SLAMM model inputs. Source datasets will include a LiDAR-derived, high resolution digital elevation model (DEM); high resolution contemporary wetlands mapped by class; high resolution impervious surfaces; land use or land cover; high resolution coastal engineering structures, and historical shoreline change, among others. [Lead: Sub-contractor; Support: CZM, partners]
c. Integrate local data on marsh accretion and erosion rates, biomass accumulation rates, salinity, and tidal inundation/hydroperiod obtained from long-term monitoring projects by MBL and other area researchers. [Lead: sub-contractor; Support: CZM, MBL, TAC]

d. Identify sub-sites for running SLAMM. Sub-sites are used to specify site-specific variables within the model. For instance, accretion can be highly variable within a site, therefore sub-sites are used to apply different accretion rates throughout the project area. [Lead: Sub-contractor; Support: CZM, MBL, TAC]

e. Process datasets as necessary, including:

- Extend the NOAA VDatum tool's coverage to the inland project boundary and transform the DEM from NAVD88 to an MTL datum;
- Convert text and vector data to raster formats for SLAMM model input; and
- Crosswalk wetlands and land cover classes to SLAMM classes for model input.

[Lead: Sub-contractor; Support: CZM, PIE-LTER]

Task 2: Run the SLAMM model, or similar, for multiple scenarios of relative sea level rise.

Timeframe: May 2014 - July 2014. Federal Funds Requested: $75,000; Matching Funds: $25,000; Total Cost: $100,000. Description of Activities:

a. Use input data compiled and developed in Task 1 to run SLAMM for different scenarios of relative SLR. [Lead: Sub-contractor; Support: CZM]

b. Perform a sensitivity analysis on the effects of various model parameters on model predictions. [Lead: Sub-contractor; Support: CZM, MBL]

c. Perform an elevation uncertainty analysis to estimate the impact of terrain uncertainty on model predictions. [Lead: Sub-contractor; Support: CZM, MBL]

d. Present preliminary model results and quality assurance test results to CZM and TAC; revise input parameters and model as necessary. [Lead: Sub-contractor; Support: CZM]

Task 3: Identify risk and vulnerability of wetland areas with respect to forecasted loss, change in type, and migration due to SLR and constraints to landward migration.

Timeframe: Aug 2014 - Dec 2014. Federal Funds Requested: $20,000; Matching Funds: $6,666.67; Total Cost: $26,666.67. Description of Activities:

a. Analyze forecasted change to identify and prioritize areas. Wetland change (i.e., forecasted loss, change in type, and migration, hereto referred to as "change") will be analyzed for the entire study area. Analysis will also be run for to examine changes in wetland buffers and setbacks (as defined in the Massachusetts Wetland Protection Act and by municipal by-laws). Change will be summarized by categories, including: wetland type; land cover or land use; land ownership; town or geographic area; and Index of Ecological Integrity scores (measures of wetland integrity, defined as condition and resiliency to anthropogenic stressors, presented as model outputs of the Conservation Assessment and Prioritization System (CAPS). [Lead: CZM; Support: MassDEP, UMass]
b. Produce final GIS datasets (with FGDC-compliant metadata records) of model inputs and outputs, barriers to marsh migration, and potential areas for marsh migration. [Lead: CZM; Support: MassDEP]
c. Incorporate GIS datasets into MORIS, CZM's web mapping portal. Package datasets for user-driven scenario analysis and display in MORIS. This will allow users to easily view SLR inundation and marsh migration datasets over different temporal and spatial scales. Ancillary datasets will also be available for overlays and basic analysis. [Lead: CZM]
d. Create a series of electronic, static maps depicting model outputs over time and space. The map series will allow users to easily compare different scenarios of SLR and potential impacts to wetlands such as migration and loss/collapse. [Lead: CZM]

e. Develop a draft report that includes: 1) details of the methods used to model sea level rise impacts to wetlands; 2) summaries of forecasted marsh loss, change, and migration as described in the Task 4 description; and 3) recommendations for enhanced protection and management of wetland resources in response to SLR. [Lead: CZM; Support: MassDEP]

Task 4: Conduct three workshops to communicate project results and discuss future management and protection of wetlands vulnerable to SLR.

Timeframe: Jan 2015 - Feb 2015. Federal Funds Requested: $10,000; Matching Funds: $3,333.33; Total Cost: $13,3333.33. Description of Activities:

a. Conduct three regional workshops to communicate project results to members of municipal, state, federal, NGO partners and stakeholder groups (e.g., the Great Marsh Coalition). The goals of the workshop will be to:
   - Present results from Tasks 1-3 using tables, static maps, and the MORIS web application;
   - Obtain feedback on modeling results, data presentation and visualizations, and guidelines for use; and
   - Seek consensus on final products and next steps. [Lead: CZM; Support: TAC]

b. Finalize the draft project report from Task 3, incorporating stakeholder feedback obtained from the workshop. [Lead: CZM; Support: MassDEP]

Task 5: Establish network of long-term monitoring stations to monitor change in the salt marsh-upland and open water/mud or sand flat-salt marsh ecotones.

Timeframe: Mar 2015 - Oct 2015. Federal Funds Requested: $25,000; Matching Funds: $8,333.33; Total Cost: $33,333.33. Description of Activities:

CZM, in coordination with the project TAC, and other partners, will establish 20-40 long-term stations to monitor biological and physical changes in the marsh-upland ecotone, using outputs

from Task 3 to select locations. Ecotone boundaries are considered to be especially responsive to environmental changes since many species exist at the limits of their physiological and ecological tolerances. Salinity is a primary driving physical factor for shaping coastal salt marsh communities. By adapting methods developed by Wasson et al (2013)[1], CZM proposes to track the movement of plant community structure in the ecotone, or transition zone, between salt marsh and upland. Data on physical factors will be collected or compiled and examined for patterns. Physical data to be collected include: hydroperiod --duration, depth, and frequency of tidal inundation--derived from pressure transducers, vertical elevation derived from survey grade RTK with GPS/GLONASS (equipment provided by project partners), and relative vertical accretion derived from marker horizons, among others, in coordination with the TAC.

a. Identify partners for monitoring network (DER, MassBays and regional partners)
b. Develop a Quality Assurance Project Plan (QAPP) and Standard Operating Procedures (SOPs) for long-term monitoring. [Lead: CZM; Support: MassDEP, TAC, MBL]
c. Analyze data from Task 3 to identify appropriate locations to install long-term monitoring stations, with guidance from the TAC and cooperation from NGOs, federal and state agencies, and municipalities. [Lead: CZM; Support: MassDEP, MBL]
d. Coordinate with organizations and landowners to be stewards of monitoring station equipment and sampling plots. [Lead: CZM, Support: TAC]
e. Procure, test/calibrate, and install equipment at each location. [Lead: CZM; Support: DER]
f. Set up long-term sampling plots and collect baseline data. [Lead: CZM; Support: MassDEP]
g. Develop database for storing data. [Lead: CZM]

[1] Wasson, K., A. Woolfolk, C. Fresquez. 2013. Ecotones as Indicators of Changing Environmental Conditions: Rapid Migration of Salt Marsh-Upland Boundaries. *Estuaries and Coasts* 36:654-664.

6. **Partnership Information** - CZM and MassDEP have worked in close coordination on successful and effective wetlands program development projects, including recent and ongoing efforts to develop Indices of Biotic Integrity (IBIs) to support the CAPS modeling effort developed by researchers at UMass-Amherst. CZM and MassDEP have participated in recent workshops with the Northeast Regional Ocean Council (NROC), coordinated by EPA Region 1 staff, to share insights on climate change and sea level rise impacts to coastal wetlands. This proposal will build and expand on modeling efforts by NOAA's Coastal Services Center with the goal of improving precision and forecasting ability for Massachusetts coastal wetland systems. CZM will be the lead on managing the modeling effort, with support from MassDEP staff, while CZM, MassDEP, and the MA Division of Ecological Restoration will work with a multi-agency and multi-stakeholder technical advisory committee, including academic experts from MBL's Plum Island Estuary Long Term Ecological Research Project, to review and discuss the mapping results produced by the model with the purpose of identifying a long term strategy for the protection and management of coastal wetland resource areas. CZM and MassDEP will work together and engage partners from the Mass Bays NEP to initiate a monitoring network to track long-term changes to vegetative communities on the border between the coastal wetland and upland ecotones. The project is designed to incorporate broad-based participation in order to ensure stakeholder input throughout the project.

7. **Milestone Schedule** - CZM anticipates a January 1, 2014 start date for this project. Milestones are included above in #5 Project Tasks.

8. Detailed Budget Work Plan by Category

Object Class Categories	Federal	Budget Breakdown	State Match: Non-Federal FTE Services	TOTAL
a. Personnel (CZM staff)	SFY 14 $10,012 SFY 15 $30,038 TOTAL $40,050		SFY14 $37,000 SFY15 $18,000 Total $55,000	**$95,050**
b. Fringe Benefits @27.27%	SFY14 $2,763 SFY15 $ 8,290 TOTAL $11,053			**$11,053**
c. Travel/Training	SFY 14 $500 SFY 15 $1,000 TOTAL $1,500			**$1,500**
d. Equipment	SFY 14 $0 SFY 15 $10,000 TOTAL $10,000	$6,500 for 10 water level loggers and accessories; $3,000 for RTK rental (12 days); $500 other		**$10,000**
e. Supplies-Office	$0			**$0**
f. Contractual:	SFY 14 $85,347	Contractual costs		**$85,347**
g. Construction	$0			**$0**
i. Total Direct Charges (Sum of a-f)	SFY 13 $98,622 SFY14 $49,328 TOTAL $147,950		$55,000	**$202,950**
j. Indirect Charges (on Personnel, and subcontractor @11.31%	$14,183			**$14,183**
k. TOTAL (i+j)	$162,133		$55,000	**$217,133**

Match will be met with SFY14 and SFY15 state funded salaries of MassDEP personnel.

9. Restoration Demonstration Project Information - Not applicable.

10. Programmatic Capability/Technical Experience Qualifications - CZM has been a key member of the New England Biological Assessment of Wetlands Working Group (NEBAWWG) since its inception and has worked for eighteen years on efforts to develop methods for the biological assessment of coastal wetland condition. CZM staff has expertise in the monitoring and assessment of coastal wetlands, including significant field-based surveys and data collection, and has worked to develop Level 2 RAM and Level 3 assessment protocols. CZM also has expertise in GIS and mapping for coastal resources, and in working with modeling products. Coordination and communication with partners and stakeholders is an essential component of

CZM activities as the agency works to promote strategies and policies to better protect coastal resources. Annotated resumes of staff and partners are attached in Appendix B.

11. **Transfer of Results** - Transfer of results is an integral task of this project. The Technical Advisory Committee (comprised of state and federal agency staff, academic experts and researchers, and coastal land managers from federal, state, local, and non-profit organizations) will be key partners throughout the project, providing input and receiving updates on progress. Workshops to present and discuss mapping products will be held, and strategies and approaches for future management actions for the protection of wetlands vulnerable will be discussed and developed. Based on workshop discussions, a strategy document will be developed for transferring the project to other regions. Based on the mapping results from the modeling, CZM and MassDEP will launch a network partnership to track changes in vegetative communities at the border of the ecotone between upland and coastal wetlands and results will contribute technical and scientific support for evolving management and planning.

C. Past Performance - CZM has worked with MassDEP and UMass-Amherst on previous WPDGs for FY10, 11, and 12 which focused on the development of the state wetlands monitoring and assessment program. CZM was the recipient of a FY11 grant below in (a), while MassDEP received grants in FY10, 11, and 12 in (b) in which CZM contributed as a partner.

1. 2011 Wetland Program Development Grant: CZM received a FY11 WPDG for two years of funding to complete field sampling of salt marsh sites to support the development of IBIs for salt marshes for correlation to IEI from the CAPS predictions, to work with UMass-Amherst researchers to run the model, to collect additional data to verify and calibrate the CAPS model, to re-visit and monitor selected coastal wetland restoration sites where restoration was completed more than ten years ago, and to review state and federal efforts to assess climate

change impacts to coastal wetlands. The second year of work on this grant will complete the sampling to support running the CAPS model and field work is planned for the coming summer season to re-sample historically monitored tidal wetlands restoration projects. Progress reports to EPA are under development.

2. 2010, 2012, and earlier WPDGs to MassDEP and UMass-Amherst were targeted towards the first three years of field data collection for IBI development for salt marshes and forested wetlands. CZM led the effort for the salt marsh field work and for the development of stressors in support of these tasks, which have been reported on by MassDEP. CZM has contributed technical expertise and comments to assist MassDEP with these grant tasks.

3. National Oceanic and Atmospheric Administration (NOAA) Grants: CZM also receives annual federal grant assistance from the National Oceanic and Atmospheric Administration (NOAA) to support MCZM program efforts, including federal consistency review, coastal shoreline and floodplain management, seafloor and habitat mapping, marine spatial planning, water quality and stormwater management, and aquatic invasive species management. CZM has successfully completed tasks and reporting requirements for NOAA since 1977.

D. Quality Assurance/Quality Control - This project will collect and use environmental data and information and a QA Plan will be developed and submitted to EPA and MassDEP for review.

E. Invasive Species Control - The Standard Operating Procedures will contain procedures for cleaning equipment and footwear in order to minimize and eliminate the introduction and spread of invasive species.

APPENDIX A: MA WETLAND PROGRAM PLAN (Revised May 28, 2013)

Note: Actions related to CZM Proposal are highlighted in YELLOW

CORE ELEMENT: MONITORING AND ASSESSMENT

Goal: To protect and improve wetland condition in order to preserve the important functions that wetlands provide including the protection of ground and surface water quality, the prevention of flooding and storm damage, the prevention of pollution, and the protection of aquatic, shellfish and wildlife habitat.

Objective: The Commonwealth of Massachusetts will continue to monitor and assess wetlands consistent with *Elements of a State Water Monitoring and Assessment Program for Wetlands* (EPA 2006) by using a 3-level approach. Level 1 - the landscape level approach – will involve assessment of wetland loss (and gain if feasible) using aerial photogrammetric mapping and assessment of wetland condition using the Conservation Assessment and Prioritization System (CAPS). Level 2 – the rapid assessment approach - will include the development of Rapid Assessment Methods (RAM's) based on Level 3 Site Level Assessment Methods (SLAMs) if feasible. Level 3 – the Intensive Site assessment – will involve use of SLAMs and Indices of Biological Integrity (IBI's) under development. This work will include establishment of baseline wetland extent and condition, determination of loss and gain, and development of wetland protection tools. This work will also inform development of wetland specific water quality standards.

Action (a): Incorporate wetlands monitoring and assessment tools into program to accomplish a long-term environmental improvement.					
Activity	**2010-2011**	**2012**	**2013**	**2014**	**2015**
Improve protection of important wildlife habitat by regulatory revisions and posting important wildlife habitat maps to the web	X	X	X		
Improve wetland condition by strengthening buffer zone protection using CAPS/SLAM tools					X
Reduce wetland loss and degradation of wetland condition through successful replacement, restoration, and enhancement of wetlands		X	X	X	X

Develop predictive modeling tools for coastal wetland resources for mapping adaptation to climate change and to support better protection and regulatory revisions				X	X
Action (b): Develop Level 1 Landscape Level Assessment Method for Statewide Use					
Activity	**2010-2011**	**2012**	**2013**	**2014**	**2015**
Develop new wetland loss maps	X			X	X
CAPS QAPP	X	X	X		
Develop coastal wetland stressor metrics (i.e. salt marsh ditching; tidal restriction; coastal structures; human disturbance)	X				
Calibrate CAPS model using Forested Wetland and Salt Marsh IBI's developed through SLAM Monitoring (See Action c below)	X	X	X	X	
Develop Rivers and Streams expert team to improve watershed metrics of CAPS model	X	X			
Develop Climate Change metrics (i.e. Thermal Stress etc) for CAPS model			X	X	
Action (c): Develop Level 3 Site Level Assessment Method (SLAM) and Indices of Biological Integrity (IBI)					
Activity	**2010-2011**	**2012**	**2013**	**2014**	**2015**
Develop and/or Update forested wetland Quality Assurance Project Plan (QAPP) and expand for use in shrub swamps	X		X	X	
Finalize Forested SLAM and expand to include shrub swamps	X	X	X	X	
2008-2012 Specimen ID and Analysis	X	X	X	X	
Final Forested Wetland IBI and development of plant based IBI's for shrub swamps	X	X	X	X	
Develop and/or Update Salt Marsh QAPP	X				
Salt Marsh Data Collection	X	X	X	X	
2009-2012 Specimen ID and Analysis	X	X	X	X	
Final Salt Marsh IBIs	X	X	X	X	

Develop SLAMs and IBIs for other wetland types (if funding available)				X	X
Monitor and Review development of National Wetland Condition Assessment and Accompany EPA Contractors in field sampling (if possible)	X	X	X		
Action (d): Develop Level 2 Rapid Assessment Method (RAM) if feasible					
Activity	**2010-2011**	**2012**	**2013**	**2014**	**2015**
Forested Wetland RAM					X
Salt Marsh RAM					X
Other Wetland Type RAM (if funding available)					X
Action (e): Use Monitoring and Assessment Tools in Decision-Making					
Activity	**2010-2011**	**2012**	**2013**	**2014**	**2015**
Develop strategy for using CAPS and SLAM/IBI's to improve permit decisions and replication/restoration success	X			X	X
Incorporate monitoring and assessment tools into decision making by informing scenario analysis; monitoring replication and restoration; improving site selection of replication and stream crossing improvements; improving wildlife habitat evaluation and better protecting buffer zones.	X	X	X	X	X
Develop Data Management System for Monitoring Data (e.g. UMass Hosted Website)			X	X	X
Conduct pilot watershed wetland monitoring and assessment for Integrated Waters Report				X	X
Incorporate predictive estimates of impacts from sea level rise and climate change into decision-making					X

CORE ELEMENT: REGULATION

Goal: To avoid and minimize wetland loss, preserve wetland function, and replace unavoidable or illegal losses with healthy wetlands that are equivalent or greater in size and that function similar to or better than lost wetlands.

Objective: Continue development of a strong regulatory program by strengthening regulations, policies and guidance documents; developing mapping tools; improving data management to maximize efficiency; creating strategies to improve mitigation success; execute strong compliance and enforcement actions; and implement innovative outreach initiatives.

Action (a): Improve Wetland Regulations, (310 CMR 10.00), policies and guidance					
Activity	**2010-2011**	**2012**	**2013**	**2014**	**2015**
Finalize revised wetland regulations (310 CMR 10.00) and publish	X	X	X		
Publish Coastal Resource Delineation Manual				X	
Update Stormwater Handbook				X	X
Post statewide CAPS wildlife maps to web concurrent with regulatory revision	X	X	X		
Update Stream Crossing Standards	X		X		
Develop Buffer Zone policy based on CAPS assessment of ecological integrity					X
Status and Trends Report (See M&A Action e, row 4 above)				X	X
Incorporate revisions to policies, guidance and regulations to adapt to climate change.					X
Action (b): Develop Wetland Mapping Tools					
Activity	**2010-2011**	**2012**	**2013**	**2014**	**2015**
Update wetland mapping	X	X	X		
Update Wetland Loss Mapping	X	X	X		
Update Eelgrass Mapping	X	X	X	X	X
Develop Maps depicting Vulnerable Wetlands	X	X	X		

Action (c): Develop Data Management Tools					
Activity	**2010-2011**	**2012**	**2013**	**2014**	**2015**
WIRe Enhancement Project (1)	X				
Evaluate WIRe for additional enhancements		X			
Implement Enhancements such as improved public access to WIRe through EIPAS project or other funding				X	X
Action (d): Successful Mitigation Projects Initiative (i.e. replacement) –Use WIRE and SLAMS to determine: Were they constructed? Were they constructed in accordance with permits? Do they replace ecological integrity of lost wetlands?; Stream Continuity Project					
Activity	**2010-2011**	**2012**	**2013**	**2014**	**2015**
Conduct Targeted Inspections of Replacement Wetland Areas and of Stream Crossings		X	X		
Analysis of Mitigation and Stream Crossing Data			X	X	
Mitigation Report				X	
Stream crossing report				X	
Identify Mitigation Projects already constructed for SLAM/IBI monitoring		X			
Develop boilerplate SLAM/IBI Condition to Incorporate into permits to assess success of mitigation projects;		X	X		
Collect data from applicants and analyze				X	X
Action (e): Perform public education and outreach about wetland protection and the regulatory process					
Activity	**2010-2011**	**2012**	**2013**	**2014**	**2015**
Strong outreach program with focus on eDEP/WIRe adoption, stormwater, restoration, regulatory reform and other topics	X	X	X	X	X
Outreach on stormwater in Franklin, Bellingham, Milford, Sharon, Walpole and Canton	X	X	X		

CORE ELEMENT: VOLUNTARY WETLAND RESTORATION AND PROTECTION

Goal: Protect wetlands from degradation or destruction and restore degraded wetlands to healthy condition to improve the important functions that wetlands provide including the protection of ground and surface water quality, the prevention of flooding and storm damage, the prevention of pollution, and the protection of aquatic, shellfish and wildlife habitat.

Objective: Define restoration goals, provide technical expertise and streamline permitting throughout Massachusetts.

Action: Work with Other Agencies to Define Restoration Goals and to Streamline Permitting Processes					
Activity	**2010-2011**	**2012**	**2013**	**2014**	**2015**
Work with multiple agencies to establish common goals for wetland protection and restoration	X	X	X	X	X
Use Point of Contact for Streamlining of Wetland Protection and Restoration Projects	X	X	X	X	X
Develop streamlined permit for restoration projects and revise regulations		X	X		

CORE ELEMENT: WATER QUALITY STANDARDS FOR WETLANDS

Goal: Improve the quality of Massachusetts wetlands in accordance with the Clean Water Act as well as the goals of the Massachusetts Water Quality Certification regulations at 314 CMR 9.00.

Objective: Ensure that wetlands are treated as waters within the state water quality program by monitoring and assessing wetland condition and developing criteria to achieve improvement.

Action: Work to Develop Tiered Aquatic Life Use Standards for Wetlands					
Activity	**2010-2011**	**2012**	**2013**	**2014**	**2015**
Review existing surface water quality standards for wetlands (i.e. classes, designated uses, antidegradation)	X	X			
Develop Biological Condition Gradient		X			
Develop Continuous Aquatic Life Use Model		X	X		
Report in Massachusetts Integrated Waters Report (305(b))	X	X	X	X	X
Consider revisions to existing surface water quality regulations		X			

Appendix B: Resumes of Key Staff

MCZM Team

Bruce Carlisle, Director, Massachusetts Office of Coastal Zone Management, directs policy development, planning efforts, and technical approaches for all CZM program areas, including Ocean Resources, Coastal Resilience, Habitat Monitoring and Assessment, Coastal Smart Growth, and Ports/Harbor Planning. Bruce has managed the Wetlands Restoration Program and has extensive experience developing and implementing coastal wetland monitoring and assessment methodologies, including CZM's RAM and Level 3 assessment procedures.

Jan Smith, CZM Coastal Habitat and Marine water Quality Manager, manages science and policy efforts for CZM Program areas related to coastal habitat protection, stormwater pollution prevention and remediation, marine invasive species, and related water quality initiatives. He is a founding member of the Northeast Aquatic Nuisance Species Panel and developed the Massachusetts' Coastal Nonpoint Source Control Plan. Jan has extensive experience monitoring and assessing coastal wetlands and co-developed CZM's RAM and Level 3 assessment procedures.

Marc Carullo, GIS and Coastal Habitat Analyst, provides project management and technical assistance to a variety of natural resource management and research projects. Marc has expertise in spatial and non-spatial data development, management, and analysis; image processing techniques and applications, and ecological field data collection, particularly in coastal wetland ecosystems. He helped develop CZM's salt marsh RAM and will manage the modeling and mapping components of this project.

MassDEP Team

Lisa Rhodes is an Environmental Analyst for the MassDEP Wetlands Program. Lisa has served as Project Manager for the MassDEP's Wetland Monitoring and Assessment Program (since 2006); is the recipient of the 2013 Massachusetts Association of Conservation Commissions Outstanding Public Service Award, was co-business lead on the Wetland Information Resource (WIRE) project; and developed wetland program directives including technical guidance documents and policies. Lisa is also the primary reviewer of major projects considered for Variances of the Wetlands Protection Act. Lisa's prior experience includes Supervisor of MassHighways Environmental Compliance Section and Conservation Administrator for the Town of Weymouth.

Michael Stroman is the Wetlands Program Chief at MassDEP. Mike is responsible for MassDEP's Statewide Wetland Permitting and Enforcement Program and regulatory and policy development. He has served at MassDEP as the Land Acquisition Manager in MassDEP's Water Supply Program.

Lealdon Langley is the Wetlands and Waterway Program Director at MassDEP where he has overseen Title 5, the Groundwater Discharge Permit Program, and the Water Management Act.

James Sprague is an Environmental Analyst at MassDEP and oversees the state's Aquatic Habitat Restoration Program including permitting restoration projects under Section 401 of the Clean Water Act. Jim is the primary reviewer for major wetlands projects and provides technical advice for Wetlands Program policies and guidance development, including stormwater, coastal geology and wetland resources, wildlife habitat and wetlands restoration.

Mike McHugh at MassDEP specializes in photo interpretation and field verification of wetlands as part of the Wetlands Conservancy Mapping Program. His responsibilities have included mapping wetland resources using modular stereoscope, 3d digital image analysis, and GIS tools, and working on wetlands change detection and field verification.

Appendix C: Support Letters from Partners

Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

One Winter Street Boston, MA 02108 • 617-292-5500

DEVAL L. PATRICK
Governor

RICHARD K. SULLIVAN JR.
Secretary

KENNETH L. KIMMELL
Commissioner

Kristen Conroy
US EPA New England Region 1
5 Post Office Square
Suite 100 (ORA01-1)
Boston, MA 02109-3912.

June 10, 2013

RE: 2013 WPDG Proposal

Dear Ms. Conroy,

The Massachusetts Department of Environmental Protection, as a partner with the Massachusetts Office of Coastal Zone Management, are pleased to express our support for the Massachusetts Office of Coastal Zone Management proposal for the 2013 Wetland Program Development Grant (WPDG). The proposal is entitled: *Salt Marsh Migration and Sea Level Rise: Modeling and Monitoring Landscape Changes in Massachusetts*.

The current proposal attempts to address the EPA Region 1 priority for this WPDG round which have been identified as including efforts to coordinate and promote research on: protecting large tracts of wetland complexes, protecting wetlands of high ecological value, and providing resilience for wetland impacts from climate change. The study objective is to conduct a pilot project to identify the risks to coastal wetland resources from the threats of sea level rise and climate change. In addition, the study is designed to understand the possible effects and changes to habitat types within coastal wetlands, to communicate these risks and vulnerability, and to use the information to advance robust coastal planning and management strategies. Finally, modeling efforts will be developed using site specific data, new LiDAR, and other land use mapping information to provide more accurate and informed forecasting of coastal wetland changes, areas of anticipated loss, areas where marsh migration may be supported, and areas that are predicted to undergo changes in wetland types.

This study will be used to produce a mapping product to assist land managers, government and non-profits, in developing strategies for how to incorporate the information into wetland protection planning efforts. The study will be used to provide further guidance on what level of data and information are needed to develop these mapping tools, based on the level of accuracy to be provided, and to assist with disseminating this effort to additional locations. The study will focus on the Great Marsh on the North Shore, where better site specific data on tidal elevation

and shoreline change exists. A TAC will be engaged to advise and offer review of the project work. A field component will be developed to establish locations to serve as long term benchmarks. Each site will be chosen based on mapping results and will serve as the locations monitor and detect changes in wetland communities at the upland/coastal wetlands ecotone boundary.

The work to be accomplished is needed so that we can accomplish our mission of maintaining and restoring the physical, chemical and biological integrity of the waters and wetlands of Massachusetts. Additionally, the work that is proposed is consistent with our EPA approved Wetland Program Plan and the details are contained within our proposal. If you have any questions, please contact Lisa Rhodes at (617) 292-5512.

Sincerely,

Beth Card, Assistant Commissioner
Bureau of Resource Protection

COMMONWEALTH OF MASSACHUSETTS
Division of Ecological Restoration
Tim Purinton, *Director*

Deval Patrick
Governor
Timothy P. Murray
Lieutenant Governor
Richard K. Sullivan, Jr.
Secretary
Mary B. Griffin
Commissioner

June 6, 2013

Ms. Kristen Conroy
US EPA Region 1
5 Post Office Square, Suite 100 (ORA01-1)
Boston, MA 02109-3912

RE: Letter of support for MA CZM EPA Wetlands Program Development Grant proposal titled *Salt Marsh Migration and Sea Level Rise: Modeling and Monitoring Landscape Changes in Massachusetts*

Dear Ms. Conroy,

The Massachusetts Division of Ecological Restoration (DER) strongly supports the EPA WPDG proposal submitted by MA CZM to assess, and develop planning and management strategies for, coastal wetland vulnerability and migration in response to future sea level rise and climate change. This work will greatly enhance the Commonwealth's ability to accurately model and predict the effects of future sea level rise on coastal wetland habitats. Most importantly, this work will spawn the development of coastal habitat management plans and actions that will be implemented by government entities, private landowners, conservation land trusts, and others to reduce future wetland losses from tidal inundation and protect open space that is suitable for wetland migration.

The need for, and benefits of, this work cannot be overstated. Examples of its direct and broad-scale utility include, informing land acquisition priorities and targeting of specific regions and parcels, identifying coastal infrastructure with increased vulnerability to storm damage as wetlands erode, and improving the prioritization and design of coastal wetland restoration opportunities.

I believe this project's return on investment for both Massachusetts and EPA in advancing the state's Wetland Program Plan and WPDG priorities will be very substantial.

Sincerely,

Hunt Durey

Hunt Durey
Acting Deputy Director

Department of Environmental Conservation
Holdsworth Natural Resources Center
160 Natural Resources Road
University of Massachusetts
Amherst, MA 01003-9285
Phone: 413.545.4300
Fax: 413.545.4358

June 7, 2013

Kristen Conroy
U.S. EPA Region 1
5 Post Office Sq., Suite 100
Mailcode ORA01-1
Boston, MA 02109-3912

Dear Ms. Conroy,

I am writing to express my enthusiastic support for the Massachusetts Office of Coastal Zone Management's (CZM) Wetlands Program Development Grant proposal titled "Salt Marsh Migration and Sea Level Rise: Modeling and Monitoring Landscape Changes in Massachusetts." Massachusetts CZM has been a perennial leader in wetland monitoring and assessment for coastal wetlands and we welcome their efforts to better understand how climate change will affect salt marshes and other coastal wetlands.

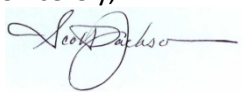
For the past several years our program at the University of Massachusetts Amherst has been engaged in a very productive partnership with CZM and MassDEP to create a comprehensive wetlands monitoring and assessment program for Massachusetts. This partnership has made significant progress in developing a sophisticated level one assessment approach (CAPS) and site level assessment methodologies (SLAMs) that currently represent level three assessment tools and may eventually yield Rapid Assessment Methods (RAMs; level two). CZM has already developed a RAM for salt marshes that serves as a model for other states and potentially for other wetland systems. By pooling the respective strengths and experience of the three agencies/organizations we are well on our way to developing a 3-level wetlands assessment program for Massachusetts that is fundamentally integrated with policy and regulations, mitigation planning and monitoring, and the prioritization of restoration opportunities.

Massachusetts CZM has played a leadership role in developing field assessment methodologies for salt marshes. The University of Massachusetts has used its CAPS software and methodology to select field sites and engaged in data analysis to develop Indices of Biological Integrity (IBIs) for these coastal wetlands. CAPS also has scenario analysis capabilities that can assess changes in ecological integrity over time as coastal wetlands respond to climate change. However, it is necessary to first understand how those wetlands systems are likely to respond to climate change. The work that CZM has outlined in its proposal is critically important for understanding the potential fate of these vitally important wetlands and providing data necessary to model those changes at a landscape scale.

We will continue to work closely with CZM in the implementation of this research. It represents an important opportunity to use the three levels of wetlands assessment to both predict and monitor changes in salt marshes and other coastal wetlands over time.

I look forward to the continuation of our successful partnership with CZM and MassDEP.

Sincerely,



Scott Jackson, Extension Associate Professor
(413) 545-4743; sjackson@umext.umass.edu)

www.ETGM.org

Eight Towns
and the
Great Marsh

Protecting
Coastal Resources
Since 1992

Amesbury
Essex
Gloucester
Ipswich
Newbury
Newburyport
Rockport
Rowley
Salisbury

A Regional Partner of
The MassachusettsBays Program

and the

National Estuaries Program

Co-sponsored by
The Merrimack Valley PlanningCommission

c/o MVPC
160 Main Street
Haverhill, MA 01830
(978) 374-0519
Fax 372-4890
pphippen@mvpc.org

Kristen Conroy
US EPA Region1
5 Post Office Square
Boston, MA 02109-3912
Silver Spring, MD 20910

Dear Ms. Conroy:

Eight Towns and the Great Marsh, a regional partner to the Massachusetts Bays National Estuary Program, and the Merrimack Valley Planning Commission is pleased to offer its full support for the Massachusetts Office of Coastal Zone Management's project proposal titled "*Coastal Wetlands and Sea Level Rise: Identifying At-Risk Resources and Supporting Adaptation Responses*." The Great Marsh ecosystem, which is the focus of this pilot project, is the largest and most important coastal wetlands complex in New England and serves as a critical ecological and economic resource for the communities bordering on the extensive salt marsh.

The challenges and uncertainties related to the potential effects of sea level rise on the Great Marsh system has been recognized as a major challenge facing local officials and citizens with whom we work on a daily basis. The goal of this first phase of the proposed project, to identify, localize, and visualize these potential impacts and opportunities for adaptation, will serve as a vital planning tool to assist us as we move ahead and work: (1) with local governments to manage and protect this important and threatened resource, and (2) nonprofit land managers and other interested parties to try to aim for a coordinated approach to natural resource protection.

We encourage EPA to lend its support to this project, and we looking forward to the opportunity presented by this project to work with EPA, CZM, and others on a very valuable endeavor.

Sincerely,

Peter Phippen
Coastal Resources Coordinator

OMB Number: 4040-0004
Expiration Date: 04/31/2012

Application for Federal Assistance SF-424

Version 02

*1. Type of Submission	*2. Type of Application	*If Revision, select appropriate letter(s):
☐ Preapplication	☑ New	
☑ Application	☐ Continuation	* Other (Specify)
☐ Changed/Corrected Application	☐ Revision	

*3. Date Received: 4. Application Identifier:

5a. Federal Entity Identifier:	*5b. Federal Award Identifier:

State Use Only:

6. Date Received by State:	7. State Application Identifier:

8. APPLICANT INFORMATION:

* a. Legal Name: Executive Office of Energy and Environmental Affairs

* b. Employer/Taxpayer Identification Number (EIN/TIN):	*c. Organizational DUNS:
04-6002284	824848451

d. Address:

*Street1: 100 Cambridge Street, 9th Floor
Street 2:
*City: Boston
County: Suffolk
*State: MA
Province:
Country: USA *Zip/ Postal Code: 02114

e. Organizational Unit:

Department Name:	Division Name:
Massachusetts Office of Coastal Zone Management	

f. Name and contact information of person to be contacted on matters involving this application:

Prefix: First Name: Christopher
Middle Name: J.
*Last Name: Garby
Suffix:

Title: Budget Manager

Organizational Affiliation:
Massachusetts Coastal Zone Management

*Telephone Number: 617.626.1148 Fax Number: 617.626.1240

*Email: christopher.garby@state.ma.us

OMB Number: 4040-0004
Expiration Date: 04/31/2012

Application for Federal Assistance SF-424 Version 02

9. Type of Applicant 1: Select Applicant Type: A. State Government

Type of Applicant 2: Select Applicant Type: - Select One -

Type of Applicant 3: Select Applicant Type: - Select One -

*Other (specify):

*10. Name of Federal Agency:
U.S. Environmental Protection Agency

11. Catalog of Federal Domestic Assistance Number:
66.461

CFDA Title:
Wetland Program Development

*12. Funding Opportunity Number: EPA-REG1 -13-14

*Title: FY13 and FY14 Region 01 Wetland Program Development Grants

13. Competition Identification Number:

Title:

14. Areas Affected by Project (Cities, Counties, States, etc.):
Coastal Massachusetts

*15. Descriptive Title of Applicant's Project:
Massachusetts Wetland Program Development 2013-14 proposal: Wetland monitoring and assessment demonstration: identifying at-risk coastal wetland resources and supporting climate change responses.

Attach supporting documents as specified in agency instructions.

OMB Number: 4040-0004
Expiration Date: 04/31/2012

Application for Federal Assistance SF-424

Version 02

16. Congressional Districts Of:

*a. Applicant 8-9

*b. Program/Project: 3-10

Attach an additional list of Program/Project Congressional Districts if needed.

17. Proposed Project:

*a. Start Date: 1/1/2014

*b. End Date: 12/31/2015

18. Estimated Funding ($):

*a. Federal	$162,133.00
*b. Applicant	
*c. State	
*d. Local	
*e. Other	$55,000.00
*f. Program Income	
*g. TOTAL	$217,133.00

***19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

☐ a. This application was made available to the State under the Executive Order 12372 Process for review on
☑ b. Program is subject to E.O. 12372 but has not been selected by the State for review.
☐ c. Program is not covered by E.O. 12372

*20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes", provide explanation.)
☐ Yes ☑ No

21. *By signing this application, I certify (1) to the statements contained in the list of certifications** and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances** and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U.S. Code, Title 218, Section 1001)

☑ **I AGREE

** The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions.

Authorized Representative:

Prefix:

*First Name: Kevin

Middle Name: George

*Last Name: Miller

Suffix:

*Title: Director of Capital and Federal Finance

*Telephone Number: 617.626.1084

Fax Number:

*Email: kevin.miller@state.ma.us

*Signature of Authorized Representative:

Date Signed: 6/12/13

OMB Number: 4040-0004
Expiration Date: 04/31/2012

Application for Federal Assistance SF-424

Version 02

*Applicant Federal Debt Delinquency Explanation

The following field should contain an explanation if the Applicant organization is delinquent on any Federal Debt. Maximum number of characters that can be entered is 4,000. Try and avoid extra spaces and carriage returns to maximize the availability of space.

N/A

BUDGET INFORMATION - Non-Construction Programs

SECTION A - BUDGET SUMMARY

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1 CZM WDPG	66.461			162,133.00	55,000.00	217,133.00
2						
3						
4						
5 Totals				$162,133.00	$55,000.00	$217,133.00

SECTION B - BUDGET CATEGORY

6. Object Class Categories	GRANTS PROGRAM, FUNCTION OR ACTIVITY				TOTALS
	(1) Federal	(2) State	(3) Other		(5)
a. Personnel	40,050.00	55,000.00	0.00		95,050.00
b. Fringe Benefits	11,053.00	0.00	0.00		11,053.00
c. Travel	1,500.00	0.00	0.00		1,500.00
d. Equipment	10,000.00	0.00	0.00		10,000.00
e. Supplies	0.00	0.00	0.00		0.00
f. Contractual	85,347.00	0.00	0.00		85,347.00
g. Construction	0.00	0.00	0.00		0.00
h. Other	0.00	0.00	0.00		0.00
i. Total Direct Charges (sum of 6a -6h)	147,950.00	55,000.00	0.00		202,950.00
j. Indirect Charges	14,183.00	0.00	0.00		14,183.00
k. TOTALS (Sum of 6i - 6j)	$162,133.00	$55,000.00	$0.00		$217,133.00

7. Program Income					$0.00

	GRANTS PROGRAM, FUNCTION OR ACTIVITY				TOTALS
6. Object Class Categories					(5)
a. Personnel					95,050.00
b. Fringe Benefits					11,053.00
c. Travel					1,500.00
d. Equipment					10,000.00
e. Supplies					0.00
f. Contractual					85,347.00
g. Construction					0.00
h. Other					0.00
i. Total Direct Charges (sum of 6a -6h)					202,950.00
j. Indirect Charges					14,183.00
k. TOTALS (Sum of 6i - 6j)					217,133.00
7. Program Income					$0.00

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SECTION C - NON-FEDERAL RESOURCES

a. Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e) TOTALS
8 CZM WDPG	0.00	55,000.00	0.00	55,000.00
9				0.00
10				
11				
12 TOTAL (sum of 8 - 11)	$0.00	$55,000.00	$0.00	$55,000.00

SECTION D - FORECASTED CASH NEEDS

	Total for 1st Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
13 Federal	$162,133.00	24,319.95	56,746.55	40,533.25	40,533.25
14 Non-Federal	$55,000.00	8,250.00	19,250.00	13,750.00	13,750.00
15 TOTAL (sum of lines 13 and 14)	$217,133.00	$32,569.95	$75,996.55	$54,283.25	$54,283.25

SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT				
	FUTURE FUNDING PERIODS (Years)			
a. Grant Program	(b) First	(c) Second	(d) Third	(e) Fourth
16 CZM WDG	268,875.00	350,000.00	350,000.00	400,000.00
17				
18				
19				
20 TOTAL (sum of lines 16 - 19)	$268,875.00	$350,000.00	$350,000.00	$400,000.00

SECTION F - OTHER BUDGET INFORMATION	
21 Direct Charges	22. Indirect Charges 11.31%. Base: 125,397. Federal share; $14,183
23 Remarks	

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